



UNIVERSITI PUTRA MALAYSIA

**EFFECTS OF DIFFERENT AGED LOGGED-OVER FORESTS ON THE
GREAT ARGUS (ARGUSIANUS ARGUS) (LINNAEUS) AT SUNGAI
LALANG FOREST RESERVE, MALAYSIA**

SENGRATH PHIRASACK

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By

SENGRATH PHIRASACK

**Thesis Submitted in Fulfilment of the Requirement for the Degree
of Master of Science in Faculty of Forestry
Universiti Putra Malaysia**

January 2001



*To my Wife, Children,
Parents, Sister and Brother*

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

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Faculty: Forestry

The Great Argus (*Argusianus argus argus*) is a moderately large size bird compared to other pheasant species. It belongs to the family Phasianidae and subfamily Argusianinae. This subspecies of Great Argus is found in most lowland and hill Dipterocarp forests up to 818 m above sea level, but is absent from heavily disturbed and fragmented forest sites. The species is considered a threatened species even though it is widely distributed throughout Peninsular Malaysia.

An in-depth study of the Great Argus was conducted in three different areas i.e. Virgin Jungle Reserve (VJR), ten-year-old logged forest (C33) and five-year-old logged forest (C18) at Sungai Lalang Forest Reserve, Selangor, Peninsular Malaysia. The purpose of

the study was to examine the distribution of the Great Argus at different elevations, to determine the population density in Virgin Jungle Reserve as well as logged forest and to compare its density in relation to the microclimate, microhabitat and arthropod abundance.

Data was collected from October 1998 until May 1999 using the Line Transect Method (LTM). The distribution and population densities of the Great Argus was conducted by line transect survey. The position of calling males was mapped.

The Great Argus was more abundant in the primary than in the logged forest and was mostly found at elevations of 150 to 400 m a.s.l. The densities in primary forest (VJR) and old logged forest (C33) were 3 birds/km² and 2 birds/km² respectively. In the recently logged forest (C18), the number of observations was too small to estimate the density.

Among the three compartments, the population density was significantly higher in Virgin Jungle Reserve than in either old or recently logged forest ($F = 8.91$, $P < 0.001$). The results also indicated that the relative abundance of the bird was significantly higher in the Virgin Jungle Forest Reserve (1.19 birds/observation) as compared to recently logged forest (C18) (0.06 birds/observation). There was no significant difference between the old logged forest (0.85 birds/observation) and Virgin Jungle Reserve.

The microhabitat, microclimate and food sources are important factors that relate to the population of Great Argus. The findings showed that the population density declined due to changes in the microhabitat, microclimate and food sources. In terms of microhabitat, there were fewer palms, climbers, less shade and litter cover in logged forest compared to the virgin forest. In terms of microclimate, the study also showed that light intensity and temperature were higher whilst relative humidity was lower in the logged forest. The food sources, namely arthropods, were also lower in the logged forest. Thus, it is recommended that logging activities must take into account factors to minimise the changes in the microhabitat, the microclimate and the food sources so as to prevent the decline in the population of the Great Argus.

Abstrak tesis dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

**KESAN PERBEZAAN UMUR HUTAN SELEPAS TEBANGAN TERHADAP
KUANG RAYA (*ARGUSIANUS ARGUS*) (LINNAEUS) DI HUTAN SIMPAN
SUNGAI LALANG, SELANGOR, SEMENANJUNG MALAYSIA**

Oleh

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Kuang raya atau “Malay Great Argus” (*Argusianus argus argus*) adalah sejenis burung kuang besar dibandingkan dengan spesies burung yang lain. Ia termasuk di dalam famili Phasianidae dan subfamili Argusianinae. Kebiasaannya, subspesies burung kuang ini dijumpai di hutan tanah rendah dan hutan dipterokarp bukit sehingga ke kawasan 818 m dari aras laut, tetapi ia tidak dijumpai di kawasan yang mengalami gangguan teruk dan berkelompok. Pada keseluruhannya spesies ini merupakan spesies terancam walaupun ia masih lagi terdapat di seluruh Semenanjung Malaysia.

Satu kajian terperinci terhadap Kuang Raya telah dijalankan pada tiga kawasan terpilih, iaitu hutan primer (VJR), hutan sepuluh tahun selepas tebangan (Kompitmen 33) dan

hutan lima tahun selepas tebangan (Kompamen 18), di Hutan Simpan Sungai Lalang, Selangor, Semenanjung Malaysia. Matlamat projek ini adalah untuk mengkaji taburan Kuang Raya pada pelbagai altitud, untuk menentukan kepadatan populasi di hutan primer berbanding hutan yang telah dibalak dan untuk mengkaji perbezaan kepadatan populasi serta hubungannya dengan mikroklimat, mikrohabitat dan banyaknya arthropoda.

Kutipan data dijalankan daripada Oktober 1998 hingga Ogos 1999 dengan menggunakan kaedah garis transek (LTM). Taburan dan kepadatan populasi Kuang Raya pula dianggarkan melalui kaedah transek survei. Kedudukan kuang jantan yang berbunyi juga dipetakan.

Kuang Raya lebih banyak dijumpai di hutan primer berbanding dengan hutan yang telah dibalak dan biasa dijumpai pada ketinggian 150 hingga 400 m daripada aras laut. Kepadatan populasi di hutan primer (VJR) dan hutan balak matang (C33) adalah 3 burung/km² dan 2 burung/km² masing-masing. Pada hutan yang baru dibalak (C18), jumlah pemerhatian adalah terlalu rendah untuk membuat anggaran kepadatan.

Di antara ketiga-tiga kompamen, kepadatan populasi secara signifikan lebih tinggi di hutan primer berbanding dengan hutan balak matang atau hutan baru dibalak ($F = 8.91$, $P < 0.001$). Keputusan juga menunjukkan bahawa jumlah relatif Kuang Raya secara

signifikan lebih tinggi di hutan primer (VJR) (1.19 burung/pemerhatian) berbanding hutan baru dibalak (C18) (0.06 burung/pemerhatian). Tiada perbezaan yang signifikan didapati diantara hutan balak matang (C33) (0.085 burung/pemerhatian) dan hutan primer (VJR).

Mikrohabitat, mikroklimat dan sumber makanan adalah faktor-faktor yang penting untuk populasi Kuang Raya. Hasil kajian menunjukkan bahawa kepadatan populasi berkurangan apabila mikrohabitat, mikroklimat dan sumber makanan berubah. Dari segi mikrohabitat, didapati bilangan palma, pemanjat, naungan dan sarap hutan adalah lebih kecil berbanding dengan hutan primer. Dari segi mikroklimat, kajian menunjukkan bahawa intensiti cahaya dan suhu adalah lebih tinggi manakala kelembapan relatif adalah lebih rendah di hutan yang telah dibalak. Sumber makanan, terutamanya arthropod, juga lebih rendah di hutan yang telah dibalak. Oleh yang demikian, dicadangkan agar aktiviti pembalakan mempertimbangkan bagaimana mengurangkan perubahan dalam mikrohabitat, mikroklimat dan sumber makanan yang mana mencegah pengurangan populasi Kuang Raya.

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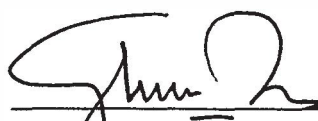
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I hereby declare that the thesis is based on my original work except for quotations and citations, which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.



SENGRATH PHIRASACK

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LIST OF ABBREVIATIONS

a.s.l.	Above see level
ANOVA	Analysis of Variance
EBA	Endemic Bird Area
C	Compartment
DF	Degrees of Freedom
km	Kilometre
km ²	Kilometre square
m	Metre
mm	Millimetre
MS	Mean Square
SE	Standard error
SS	Sum of Squares
UKM	Universiti Kebangsaan Malaysia
VJR	Virgin Jungle Reserve or Compartment VJR
C33	Old Logged Forest or Compartment 33
C18	Recently Logged Forest or Compartment 18
DMRT	Duncan's Multiple Range Test

CHAPTER I

INTRODUCTION

The most recent review of the world's birds estimates that 1,029 species are now globally threatened (Collar and Andrew 1988). Of the 256 species of Galliformes currently described, 68 species are now considered to be globally threatened and 39 (58 percent) of these species are found in Asia (Collar and Andrew 1988). Within Asia, 43 species of Galliforms were identified as being restricted range species; including 28 species that are considered globally threatened. Amongst the 39 globally threatened species of Galliforms occurring in Asia, 82 percent occur in at least one Endemic Bird Area (EBA) and only five globally threatened non-restricted range Galliforms are not found in an EBA (Eames and Rands, 1992).

All pheasants are totally protected under the Wildlife Protection Act, 1972 amended in 1976 (Siti Hawa, 1992). Keeping, possessing and trading them are offences against this legislation, unless a special permit is held from the Minister of Science and Environment.

Many tropical countries, especially in Southeast Asia, are concerned with the effects of selective logging on fauna and flora. Logging practices have caused reduction in of forest areas and problems to wildlife conservation, particularly, the wildlife population of birds such as Great Argus. Loss of habitat greatly affects wildlife

resources in tropical forests. The tropical forest is an extremely valuable economic resource for the South-east Asian countries. Unfortunately, the area of such forest under any type of protection is less than 5% of the total forested area worldwide (Skorupa, 1986; John, 1992).

Selective timber logging affects the avifauna in many ways (Zakaria and Nordin, 1998). Most bird communities are adversely affected by logging. Terrestrial species and understorey insectivores are among the most deleteriously affected. The decrease in species diversity suggests that forest disturbance may favour generalist over specialist terrestrial birds (Zakaria and Nordin, 1998).

Zainudin (1996) reported that the terrestrial birds were the worst affected after logging. Johns (1983) suggested that terrestrial birds were less able to cope with the harsher environmental changes in the understorey of logged forest and the limited availability of suitable foraging ground and vegetative cover.

Problem Statement

Logging in dipterocarp forests of South-east Asia has considerably changed the forest, both as a result of initial felling damage and alteration of forest growth dynamics (Johns, 1988 and Whitmore, 1991). Such activity has increasingly affected the population density, microclimate, microhabitat and food resources of the Great Argus.

McGowan and Garson (1995) defined habitat loss as all forms of modification to habitat structure that lead to a reduction in the extent or quality of habitat available for a particular taxon. The causes of habitat loss range from felling of large blocks of forest through selective logging, to habitat degradation resulting from the excessive impact of domestic stock grazing, to urban development.

Although pheasants occur in some of the least studied terrestrial environments, they are among the most seriously impacted of all major bird groups as a result of human exploitation and habitat destruction (Johnsgard, 1986).

The precise population and distribution status of the Great Argus has not been well documented. To understand the importance of logged forest areas in the future survival of the species or to develop any type of management plan would require advanced knowledge and understanding of the species distribution, population density and recovery of the species in the logged forest.

There is little information on the ecology, especially in terms of food resources and environmental requirements, of the Great Argus in Malaysia. Information on the food and feeding preferences is useful in analysing the animal dispersal as well as distribution. It is also important in formulating sound and appropriate management or conservation strategies.